PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in or relating to Cutting-out Presses

We, JAMES ARTHUR BARCLAY and WILLIAM YULLE BARCLAY, both British subjects, and both of 954, Chester Road, Stretford, Manchester, do hereby declare the nature of this invention to be as follows:—

This invention relates to cutting out presses of the kind employing a knife-like punch and such as is used for punching shapes out of rubber, leather, cardboard and like soft materials.

At present, machines for punching shapes out of sheets or strips of leather or rubber comprise a pair of relatively movable platens and a separate knife member. The operator places the knife on the sheet and then places the sheet and knife between the platens, which are then brought together under pressure to force the knife through or into the sheet. The platens are then separated and the operator draws the sheet forward, lifts the knife out of the hole in the sheet and then pushes the shape out of the knife, all of which entails slow manipulation.

These machines also require a cutting block, or under sheet, in order that the knife may completely sever the shape without damage to its edge against the opposite platen.

The object of this invention is to make the whole process mechanical and, by cutting out manipulation, reduce the danger of accidents.

According to the invention a cutting out press for cutting out shapes of rubber, leather, or like soft materials comprises a complementary knife shape and die, mounted for relative movement, and a shape extractor within the knife, carried by means stationary relative to the die.

According to a further feature of the invention means are provided for forming holes or apertures in the shapes comprising further knives within the main knife, corresponding apertures in the die co-operating with such further knives and further extractors movably mounted in the further knives so as to push out the cuttings from said further knives before they are separated from the die.

In one example of the invention a machine for making rubber lids for accumulators comprises a frame, with side legs supporting a platform for the fixed platen, the side legs extending above the same to form guides for the movable platen. The movable platen is operated in the usual manner from a shaft mounted in the frame and carrying a pair of eccentrics connected by rods to the movable platen.

Secured by bolts to the fixed platen is the die comprising a base plate, in the centre of which is fixed a rectangular die proper, shaped externally to the required rectangular shape for the lid and having three holes, one at each end for the lugs of the battery plates and one in the centre for a filling plug. At the front side of this die proper is a box-like guide through which a strip of rubber may be fed, whilst at the rear side is a guide plate over which the punchings may be delivered.

At each end of the die and fixed into the base plate is an upright guide rod on which the base plate of the upper platen is mounted. Detachably secured to this base plate is a box-like knife adapted to register with the die and having within it three tubular further knives the cutting ends of which are level with the cutting edge of the main knife. The base plate of the upper platen has two guide lugs which fit over the guide rods in the lower platen.

Within the main knife is an extractor plate having clearance holes for the tubular knives and itself carried by two small rods which pass through the base plate of the upper platen and which are secured to another part of the machine as described later.

Over the top of the frame is a bridge-piece, off-set slightly to the back and having a grooved bar fixed to the front face, in the groove of which are positioned two bolts, the heads of which can be moved laterally in the groove for lateral adjustment. Through the head of each of these bolts and just in front of the grooved bar is a hole adapted to receive the end of the rods previously described, attached to the extractor plate. Such rods are adjustably secured by a collar mounted on the bolt and a nut and washer on the end of the bolt.

[*Price* 1/-]

Mounted across the platen and towards the back in suitable bearing blocks is a stiff shaft having a key, on which shaft are mounted three arms, having key ways engaged by the key on the shaft, their ends extending forwardly over the centre of the machine. These ends are bifurcated and carry pins on which are suspended ejector rods which hang freely down through the holes in the tubular knives. At both ends of the shaft are other arms, projecting rearwardly, which are adapted to engage stops fixed to the side arms, and to cause downward movement of the extractor plungers during the last part of the downward movement of the upper platen.

At the front of the machine are mounted two feed rollers each carried by arms from brackets at the front of the frame by means of a single bolt in each bracket, arranged so that one arm for the lower roller can be fixed by tightening the bolt, whilst the other arm is pivotally mounted on the bolt. The upper roller, is adapted by own weight, to press on the rubber sheet and such pressure can be limited by long set screws fixed on the arms. On one of the pivot bolts are rotatably mounted two idle chain wheels, whilst on the adjacent ends of the two rollers are also chain wheels which are of the same diameter as each other. A single chain is arranged over these four chain wheels so that the two rollers rotate in opposite directions to act as feed rollers. On the lower roller is a free wheel chain wheel, over which is a chain having a weight suspended on one end and the other end being taken down over an idle chain wheel mounted on the frame and then brought up and fixed to the end of a lever which rests on a lug secured to one of the rods of the eccentrics. The drive for the machine includes the usual flywheel and clutch mechanism. At the front of the machine is also an adjustable wooden table with an adjustable side gauge, whilst boxes are provided at the back to receive the lids and the remaining part of the rubber strip, and at the front to receive the round punchings from the holes.

In operation, the workman places a strip of rubber on the table and by turning the feed roller by means of a hand wheel at the side of the machine, is able to feed the sheet into position for punching the first lid, the upper platen being then in the raised position. On releasing the clutch the machine then proceeds automatically as follows:—

The upper platen descends and cuts the rubber as to its external shape and as to the holes therein. The upper platen then descends slightly further to enable the arms to engage their stops and cause the ejector plungers to move downwardly through the tubular knives forcing the circular cuttings out through the die. The platen then commences to rise, the ejector plungers are automatically withdrawn by spring return means provided on end arms. As the platen rises further, the box-like knife rises around the fixed ejector plate, such plate operating to hold the rubber whilst the knife is withdrawn from its cut. The shape, with its holes remains in the chain-like surrounding portions of the strip, from which it falls as the latter passes down into box at the back of the machine. The upper platen rises further above the ejector plate and during such motion the stud on the eccentric rod raises the lever, pulls on the chain and causes rotation of the feed rollers to bring the rubber strip into position for punching the next lid. The chain is connected to the lever so that it can be adjusted along the same to adjust the amount of rotation of the rollers. On the downward movement of the platen the free wheel operates to over-run, the weight keeping the chain in tension without rotating the rollers.

The invention is obviously not limited to the use or details of construction of the example above described as such a machine could obviously be used for other purposes than punching lids for accumulators and with other materials than rubber, and also many of the details of construction could be altered without departing from the nature of the invention.

Dated this 16th day of December, 1938.

WILSON, GUNN & ELLIS,
Chartered Patent Agents,
54/56, Market Street, Manchester, 1.

COMPLETE SPECIFICATION

Improvements in or relating to Cutting-out Presses

We, JAMES ARTHUR BARCLAY and WILLIAM YULLE BARCLAY, both British subjects, and both of 954, Chester Road, Stretford, Manchester, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to cutting-out presses of the kind employing a knife-like

punch and such as are used for punching shapes out of rubber, leather, cardboard and like soft materials.

At present, cutting-out presses for punching shapes out of sheets or strips of leather or rubber generally comprise a pair of relatively movable platens and a separate knife member. The operator places the knife on the sheet and then places the sheet and knife between the platens, which are then brought together under pressure to force the knife through or into the sheet. The platens are then separated and the operator draws the sheet forward, lifts the knife out of the hole in the sheet and then pushes the shape out of the knife, all of which entails slow manipulation. These machines also require a cutting block, or under sheet, in order that the knife may completely sever the shape without damage to its edge against the opposite platen. A cutting-out machine for making interlocking linoleum tiles and inlays has been proposed, however, in which the cutting out knife operating without a complementary die has been fixed directly or indirectly to the movable platen with a clearing plate located therein and connected by studs passing through the platen to a relatively stationary frame above the platen, the material being preferably cut on lead plates.

The object of this invention is to make the whole process mechanical and, by eliminating manipulation, to reduce the danger of accidents.

According to the invention a cutting-out press for cutting out shapes of rubber, leather, or like soft materials comprises a complementary knife shape and die mounted for relative movement, and a shape extractor over the die carried by means stationary relative to the die.

According to a further feature of the invention means are provided for forming holes or apertures in the shapes comprising further knives within the main knife, corresponding apertures in the die co-operating with such further knives and further extractors movably mounted in the further knives so as to push out the cuttings from said further knives before they are separated from the die.

In the accompanying drawings:—

Fig. 1 is a front view of one example of a cutting-out press made in accordance with the invention, part of the front mechanism being broken away to show other parts behind.

Fig. 2 is an end view of Fig. 1.

Fig. 3 is an enlarged part sectional elevation of the upper and lower platens and their attached parts.

Fig. 4 is a plan of the rubber strip with one punched shape therein.

Fig. 5 is an elevation of the punched shape shown in Fig. 4.

In the example of the invention illustrated in the drawings, a cutting-out press for making rubber lids for accumulators comprises a frame 10, with side legs 11, supporting a platform 12 for the fixed platen 13, the side legs extending above the same to form guides 14 for a movable frame 15 carrying the movable platen 16. The ends 17 of the frame slide in the guides 14. The movable platen 16 is operated in the usual manner from a shaft 18 mounted in the frame and carrying a pair of eccentrics 18*a* connected by rods 19 to the frame 15 carrying the movable platen.

Secured to the platform 12 is the fixed platen 13 comprising a base plate, in the centre of which is fixed a rectangular die 20, shaped externally to the required rectangular shape for the lid and having three holes 21, one at each end for the lugs of the battery plates and one in the centre for a filling plug. At the front side of this die 20 is a box-like guide 22 through which a strip of rubber may be fed, whilst at the rear side is a guide plate 23 over which the punchings may be delivered.

At each end of the die 20 and fixed into the base plate of the platen 13 is an upright guide rod 24 on which the base plate 16*a* of the upper platen 16 is mounted. Detachably secured to this base plate 16*a* is a box-like knife 25 adapted to register with the die 20 and having within it three tubular further knives 26, the cutting ends of which are level with the cutting edge of the main knife 25. The base plate 16*a* of the upper platen has two guide lugs 27 which fit over the guide rods 24 in the lower platen.

Within the main knife 25 during the cutting operation is an extractor plate 28 having clearance holes 29 for the tubular knives 26 and itself carried by two small rods 30 which pass through the base plate 16*a* of the upper platen and which are secured to another part of the machine as described later.

Over the top of the frame is a bridge-piece 31, off-set slightly to the back and having a grooved bar 32 fixed to the front face thereof, in the groove of which are positioned two bolts 33, the heads of which can be moved laterally in the groove for lateral adjustment. Through the end of each of these bolts and just in front of the grooved bar is a hole adapted to receive the end of the rods 30 previously described, attached to the extractor plate 28. Such rods 30 are each adjustably secured by a collar 34 mounted on the bolt 33 and a nut 35 and washer 36 on the end of the bolt.

Mounted across the movable frame 15 and towards the back thereof in suitable bearing blocks 37 is a stiff shaft 38 having a key 39, on which shaft are mounted three arms 40, having key ways engaged by the key on the shaft, their ends extending forwardly over the centre of the machine. These ends are bifurcated and carry pins 41 on which are suspended ejector rods 42 which hang freely down through the holes in the tubular knives 26. At both ends of the shaft are other arms 43, projecting rearwardly, which are adapted to engage stops 44 fixed adjacent to the side arms 14, and to cause downward movement of the extractor plungers 42*a* on the ends of the rods 42 during the last part of the downward movement of the upper platen 16.

At the front of the machine are mounted two feed rollers 45*a* and 45*b* each carried by arms 46 from brackets 47 at the front of the frame 10 by means of a single bolt 48 in each bracket, arranged so that one arm for the lower roller can be fixed by tightening the bolt, whilst the other arm is pivotally mounted on the bolt. The upper roller 45*a* is adapted by own weight, to press on the rubber sheet and such pressure can be limited by long screws 49 fixed on one arm and engaging the other. On one of the pivot bolts are rotatably mounted two idle chain wheels 50 and 51, whilst on the adjacent ends of the two rollers are also chain wheels 52 and 53 which are of the same diameter as each other. A single chain 54 is arranged over these four chain wheels so that the two rollers rotate in opposite directions to act as feed rollers. On the lower roller 45*b* is a free wheel chain wheel 55, over which is a chain 56 having a weight 57 suspended on one end and the other end being taken down over an idle chain wheel 58 mounted on the frame 10 and then brought up and fixed to the end of a lever 59 which rests on a lug 60 secured to one of the rods 19 of the eccentrics. The drive for the machine includes the usual combined belt pulley and flywheel 61 and clutch mechanism operated by clutch lever 62. At the front of the machine is also an adjustable wooden table 63 with an adjustable side gauge, not shown, whilst boxes 64 and 65 are provided at the back to receive the lids and the remaining part of the rubber strip, and at the front to receive the round punchings from the holes.

In operation, the workman places a strip of rubber on the table and by turning the feed roller 45*a* by means of a hand wheel 45*c* at the side of the machine, is able to feed the sheet into position for punching the first lid, the upper platen 16 being then in the raised position. On releasing the clutch lever 62 the machine then proceeds automatically as follows:—

The movable frame 15 and upper platen 16 descend and the knives 25 and 26 cut the rubber as to its external shape and as to the holes therein respectively as shown in Figs. 4 and 5. The upper platen then descends slightly further to enable the arms 43 to engage their stops 44 and cause the ejector plungers 42*a* to move downwardly through the tubular knives 26 forcing the circular cuttings out through the die 20. The upper platen 16 then commences to rise, the ejector plungers 42*a* are automatically withdrawn by return springs 43*a* provided on the ends of the arms. As the upper platen 16 rises further, the box-like knife 25 rises around the fixed ejector plate 28, such plate operating to hold the rubber whilst the knife is withdrawn from its cut. The shape, with its holes remains in the chain-like surrounding portions 66 of the strip, from which it falls as the latter passes down into the box 64 at the back of the machine. The upper platen 16 rises further above the ejector plate 28 and during such motion the collar 60 on the eccentric rod 19 raises the lever 59, pulls on the chain 56 and causes rotation of the feed rollers 45*a* and 45*b* to bring the rubber strip into position for punching the next lid. The chain is connected to the lever 59 by a slot 59*a* so that it can be adjusted along the same to adjust the amount of rotation of the rollers. On the downward movement of the upper platen 16 the free wheel 55 operates to over-run, the weight 57 keeping the chain 56 in tension without rotating the rollers.

The invention is obviously not limited to the use or details of construction of the example above described as such a machine could obviously be used for other purposes than punching lids for accumulators and with other materials than rubber; and also many of the details of construction could be altered without departing from the nature of the invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A cutting-out press for cutting out shapes of rubber, leather or like soft materials, comprising a complementary knife shape and die mounted for relative movement, and a shape extractor over the die carried by means stationary relative to the die.

2. A cutting-out press according to claim 1, characterised by means for form-

ing holes or apertures in the shapes comprising further knives within the main knife, corresponding apertures in the die co-operating with such further knives and further extractors movably mounted in the further knives so as to push out the cuttings from said further knives before they are separated from the die.

3. A cutting-out press according to claim 2, characterised in that the further extractors are operated by the last portion of the relative movement between the knives and the die.

4. A cutting-out press according to claim 1 or 2, characterised in that the forward movement of the sheet or strip ready for cutting out the next shape is obtained from retraction movement of the knife.

5. A cutting-out press according to claim 3, characterised by means for adjusting the forward movement of the sheet or strip without altering the stroke of the knife.

6. A cutting-out press according to claim 4 or 5, characterised in that the forward movement for the sheet or strip comprises feed rollers operated by mechanism embodying ratchet or free-wheel motion.

7. A cutting-out press according to any of the preceding claims, characterised by hand-operated means for facilitating initial feeding of the sheet or strip to the machine for punching the first shape.

8. A cutting-out press for cutting out sheets of rubber, leather or like soft materials according to any of the preceding claims, constructed in substance, as herein described with reference to and as illustrated in the accompanying drawings.

9. A cutting-out press for cutting out shapes of rubber, leather or like soft materials, constructed as described with reference to and as illustrated in the drawings.

Dated this 11th day of December, 1939.
For the Applicants,
WILSON, GUNN & ELLIS,
Chartered Patent Agents,
54/56, Market Street, Manchester, 1.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1940.

[This Drawing is a reproduction of the Original on a reduced scale.]

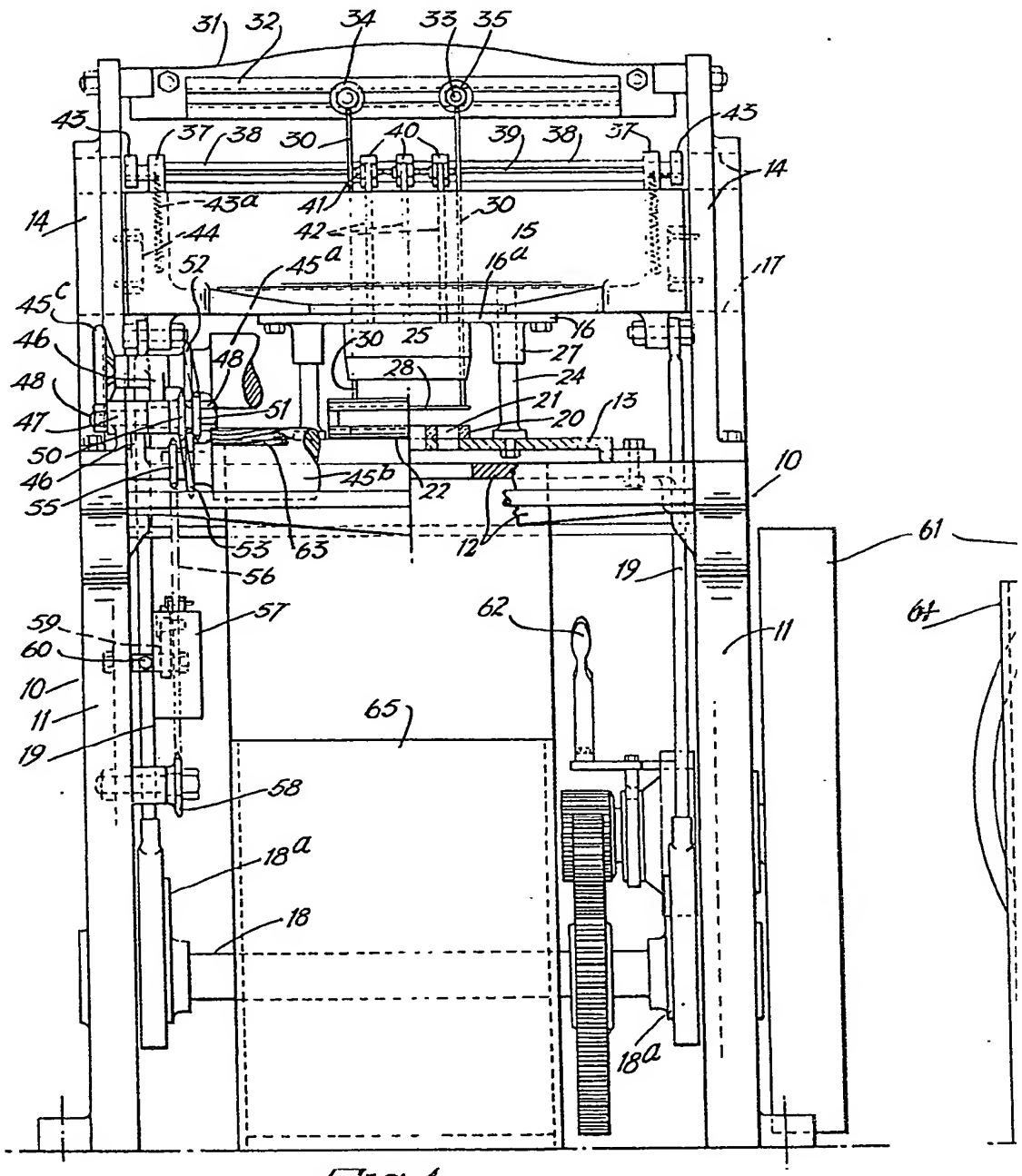

FIG. 1.

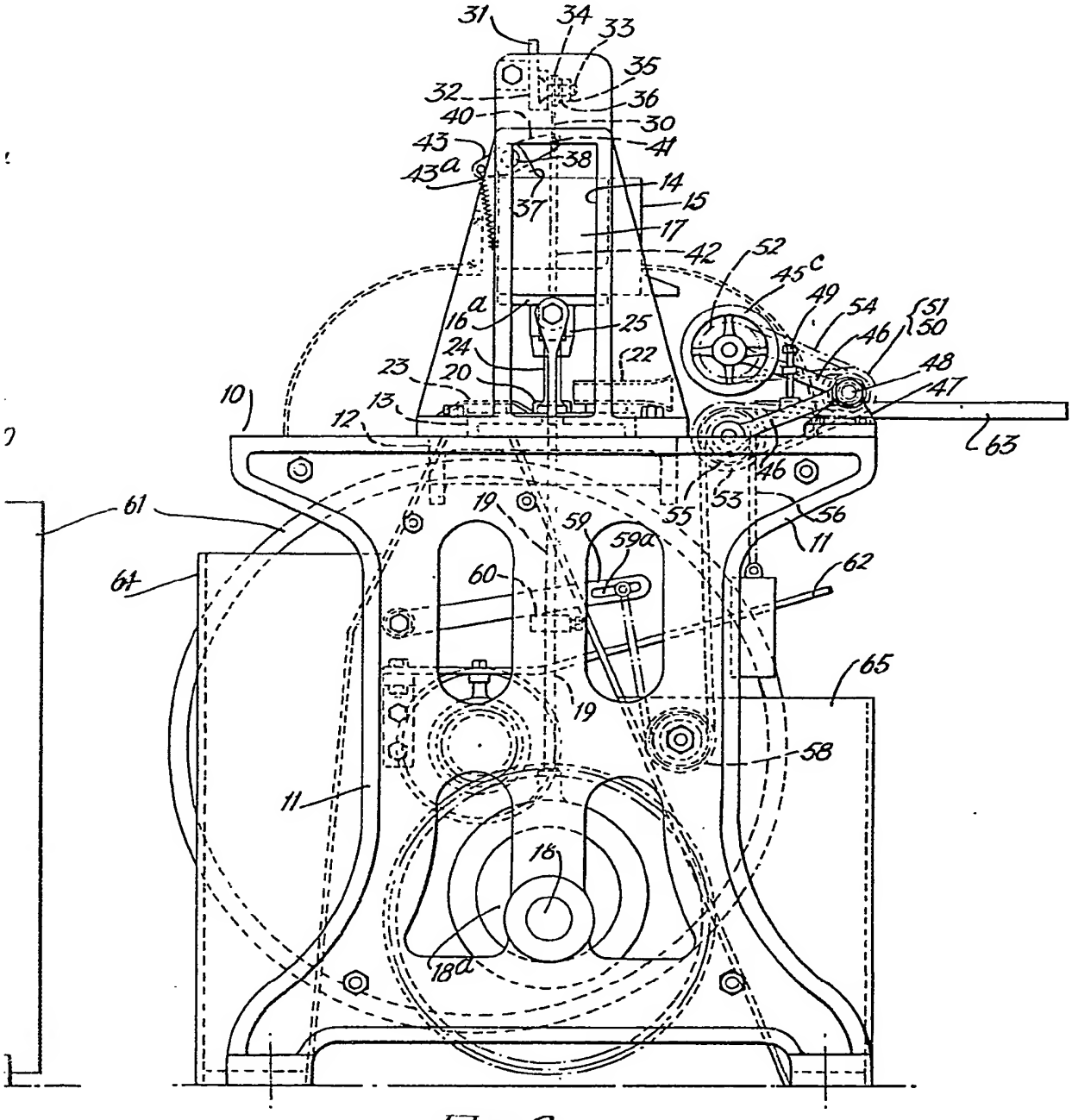

FIG. 2.

Malby & Sons, Photo-Lith.

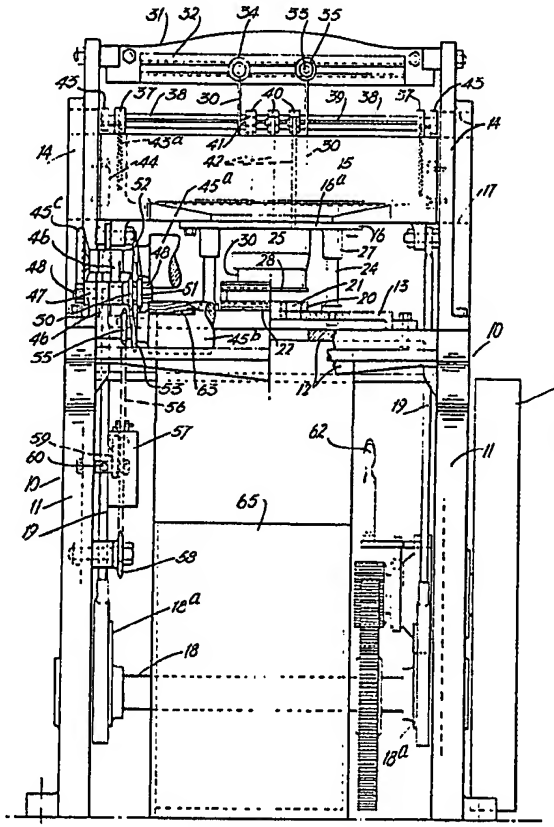

FIG. 1.

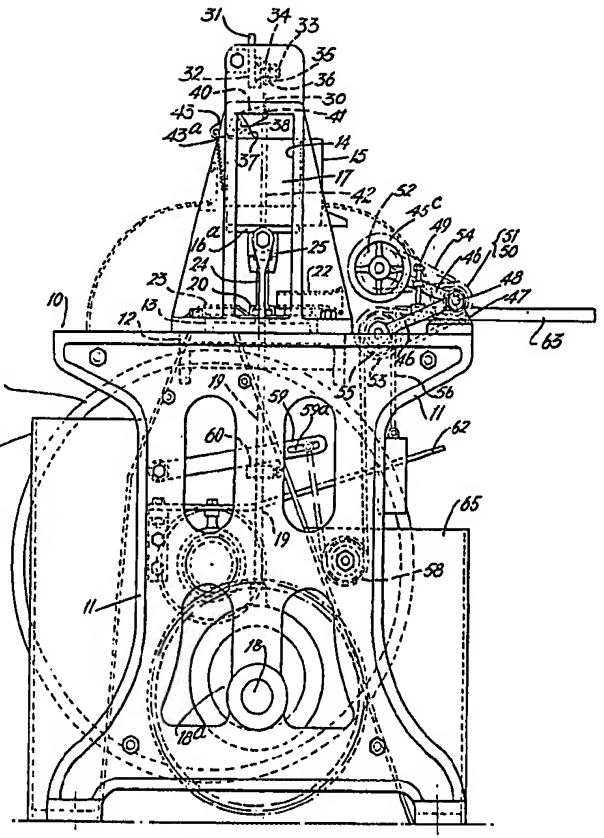

FIG. 2.

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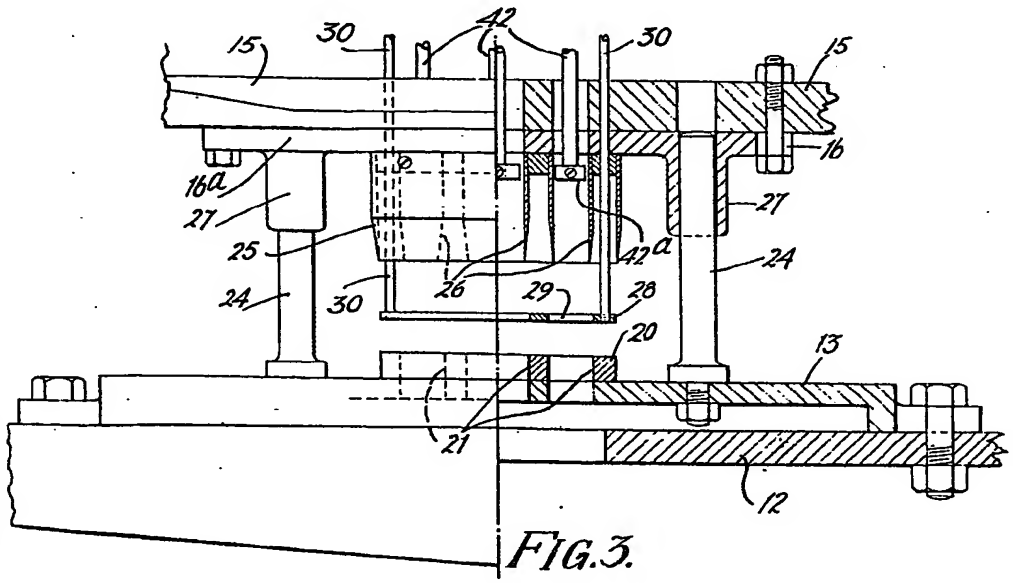

FIG. 3.

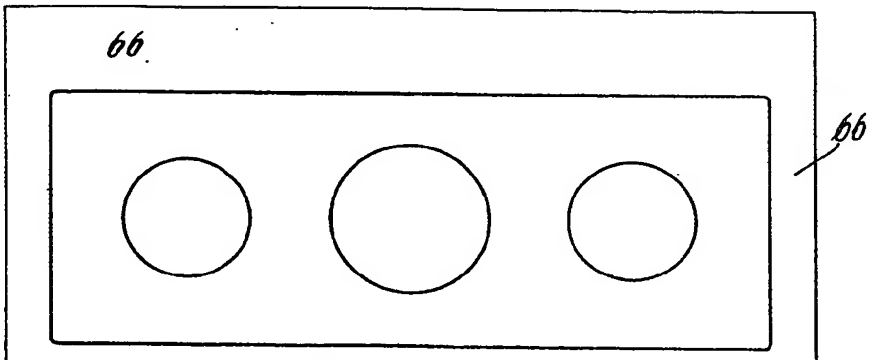

FIG. 4.

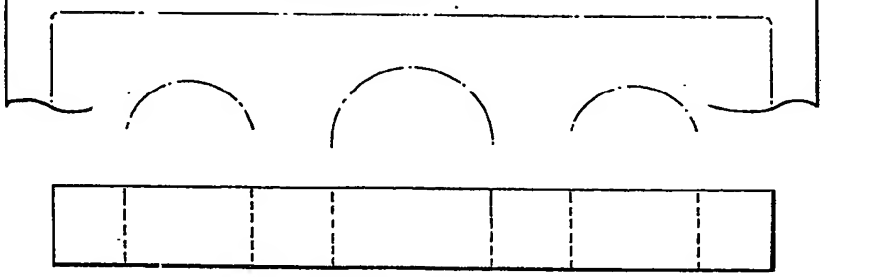

FIG. 5.

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